# 5.4 Surface Water, Water Quality, and Floodplains

*Realignment of the southbound lanes will cover a portion of a stream located in the median of the I-405 roadway. WSDOT will create 500 feet of new stream channel and provide 1.2 acres of new streamside vegetation and 1 acre of enhanced stream buffer along the newly created stream channel.*

*The Bellevue Nickel Improvement Project will create about 10.3 acres of new roadway surface. WSDOT will provide stormwater treatment for 17 percent more area than is being created.*

**Stream with large woody debris**

*Please refer to the Bellevue Nickel Improvement Project Surface Water, Water Quality, and Floodplains Discipline Report in Appendix N (on CD) for a complete discussion of Surface Water, Water Quality, and Floodplains.*

## What is our study area for this analysis?

We defined the study area as the area in which surface water and floodplains could show effects from highway construction and operation. The study area includes the highway right of way between MP 11.2 at the southern end and MP 13.2 at the northern end. Surface water and floodplains located as far as 300 feet upstream of the highway right of way (maximum distance anticipated for upstream effects) and 0.25 mile downstream (maximum distance anticipated for effects due to both construction and future stormwater events) are also included in the study area.

## What surface water occurs in the study area?

Surface water within the study area includes streams, wetlands, and Mercer Slough, a backwater channel that connects to Lake Washington (see Exhibit 5.4-1).

All study area streams ultimately drain to Mercer Slough or its associated wetlands and then to Lake Washington. The watershed for Mercer Slough covers an area of 10,871 acres, and is composed of 10 sub-basins. Most of the study area is located in two sub-basins, Mercer Slough and Sturtevant Creek . A small portion of the project drains to the Kelsey Creek sub-basin.

**Fish ladder at the outlet of the Kelsey Creek/Mercer Slough culverts**

**Inlet to Kelsey Creek/Mercer Slough culverts**

Kelsey Creek (MP 12.72) and Sturtevant Creek (MP 13.15) are the largest streams in the study area. Kelsey Creek passes under I-405 through two parallel culverts. Downstream of these culverts, the stream becomes Mercer Slough. Kelsey Creek is the only stream crossing I-405 in the study area that is passable by fish (WSDOT 2005).

One of the culverts discharging Kelsey Creek to Mercer Slough has a fish ladder to improve fish migration to upstream watersheds.

Sturtevant Creek passes under I-405 in two culverts located at MP 13.15. Sturtevant Creek then flows south, parallel to 114th Ave Southeast and discharges into Mercer Slough. Sturtevant Creek is outside of the project construction area and the project will not directly affect it.

Three small, unnamed streams cross the project area between MP 11.5 and MP 11.8 via culverts under I-405 and local streets. They drain to Mercer Slough where they cease to have defined channels and become stream flows that either infiltrate into the soil or spread out into a nearby wetland.

Trail Creek and Median Stream are two additional small channels that cross the project area between MP 12.0 and MP 12.5 and drain to Mercer Slough west of the project. Trail Creek crosses I-405 between MP 12.0 and 12.1. Median Stream flows in the I-405 median, crosses I-405 via a series of culverts near MP 12.4, and flows to and along Southeast 118th Avenue. As with the unnamed streams, Trail Creek and Median Stream lose channel definition in the wetland complex of Mercer Slough.

**Water Quality**

Water quality refers to the physical and chemical properties of water that affect its capability to support beneficial uses. Federal, state, and local agencies regulate surface water quality to maintain a variety of beneficial uses, including domestic water supply, irrigation, fish and shellfish rearing, recreation (such as swimming and sport fishing), commerce and navigation, and wildlife habitat. Source: Chapter 173-201A WAC.

## What is the quality of surface water in the study area?

Ecology has established state-wide water quality standards for temperature, dissolved oxygen, stream flow, and a wide variety of polluting substances in surface water (WAC 173-201A). Several agencies, including Ecology, have been monitoring water quality in Kelsey Creek, Mercer Slough, and Sturtevant Creek for a number of years. The monitoring has revealed a variety of water quality problems in these water bodies.

## Kelsey Creek

Kelsey Creek is on the Ecology 303(d) list of water quality impaired surface water due to high temperatures, low levels of dissolved oxygen, and the presence of fecal coliform bacteria (Ecology 2005). In 1979 and 1980, a number of pesticides including DDT, dieldrin, and heptachlor were detected in Kelsey Creek. The high temperatures, low levels of dissolved oxygen, nutrient concentrations, and bacterial pollution in Kelsey Creek are fairly typical of streams in urban areas.

**What is the Ecology 303(d) list?**

The 303(d) list identifies surface water body segments (lakes, streams, rivers, and ponds) with degraded water quality. Ecology assembles available water quality data and publishes this list, as required under section 303(d) of the federal Clean Water Act (40 CFR 130.7, as revised July 1, 2003).

## Mercer Slough

Mercer Slough is on the state 303(d) list for high temperatures, low levels of dissolved oxygen, and the presence of fecal coliform bacteria (Ecology 2005). Dissolved oxygen depletion is fairly common in streams, such as Mercer Slough, that are slow-moving and support dense growth of submerged vegetation or algae. Although highway runoff contributes to the pollutant load of Mercer Slough (as well as tributaries in the study area), highway runoff is a relatively small fraction of the total pollutant load of Mercer Slough (approximately 2 percent of the load of phosphorus, nitrogen, chemical oxygen demand, and suspended solids).

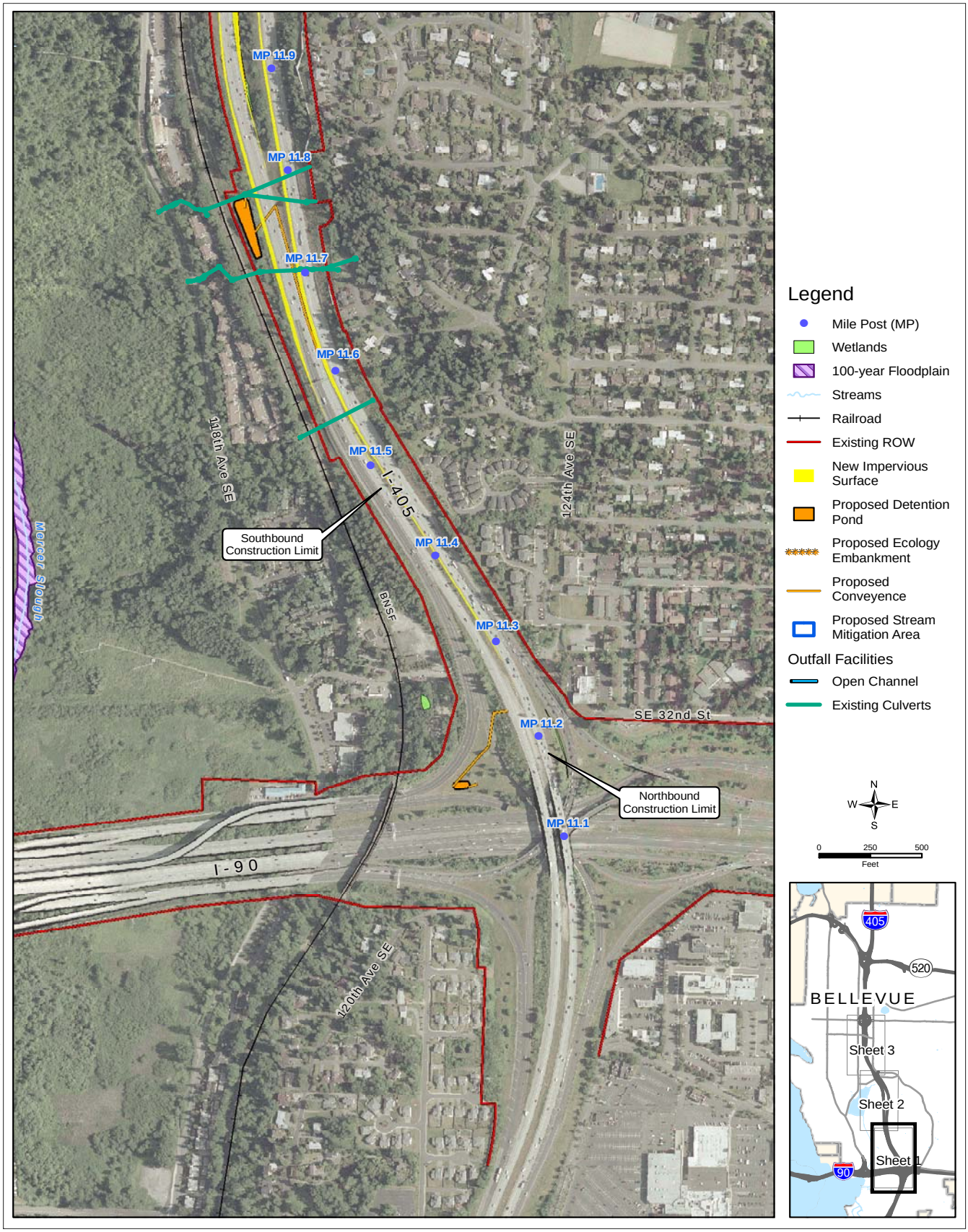
## Sturtevant Creek

Water samples from Sturtevant Creek in the early 1990s revealed relatively high levels of suspended solids, turbidity (cloudiness), oils, greases, petroleum hydrocarbons, and chemical oxygen demand compared to other Bellevue streams (City of Bellevue Utilities Department 2003). The sources of these pollutants were not identified.

# Why do we need to consider floodplains?

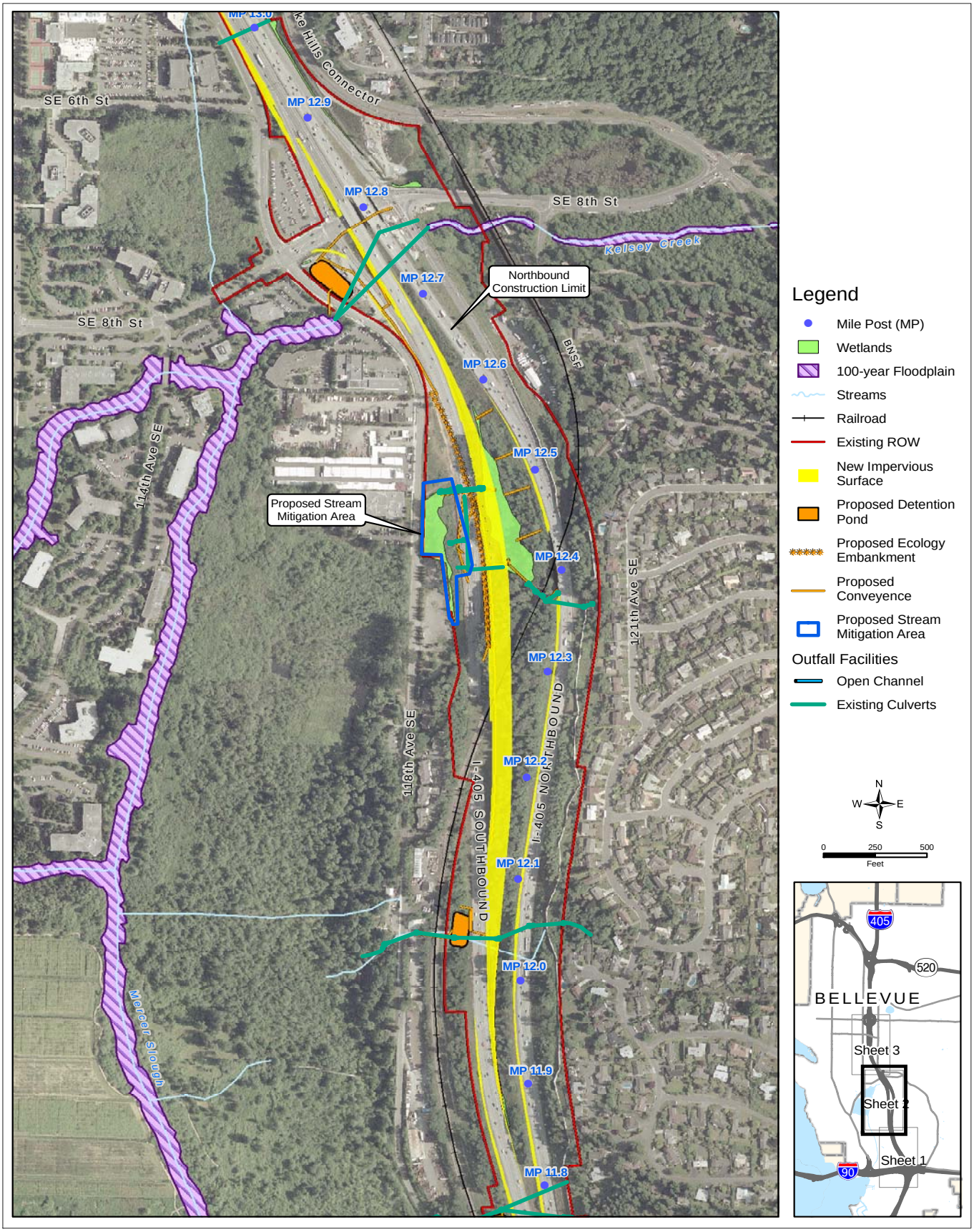
Floodplains are important because they store floodwaters during high flow, offsetting flooding of other areas downstream. When development or natural processes (such as landslides or deposit of sediment) encroach on floodplains, there may be changes in the speed of water passing through streams, bank erosion, or location of flooding that can cause damage to habitat or human development elsewhere along the stream.

Exhibit 5.4-1. Surface Water and Floodplains, MP 11.1 to 11.9 (Sheet 1 of 3)



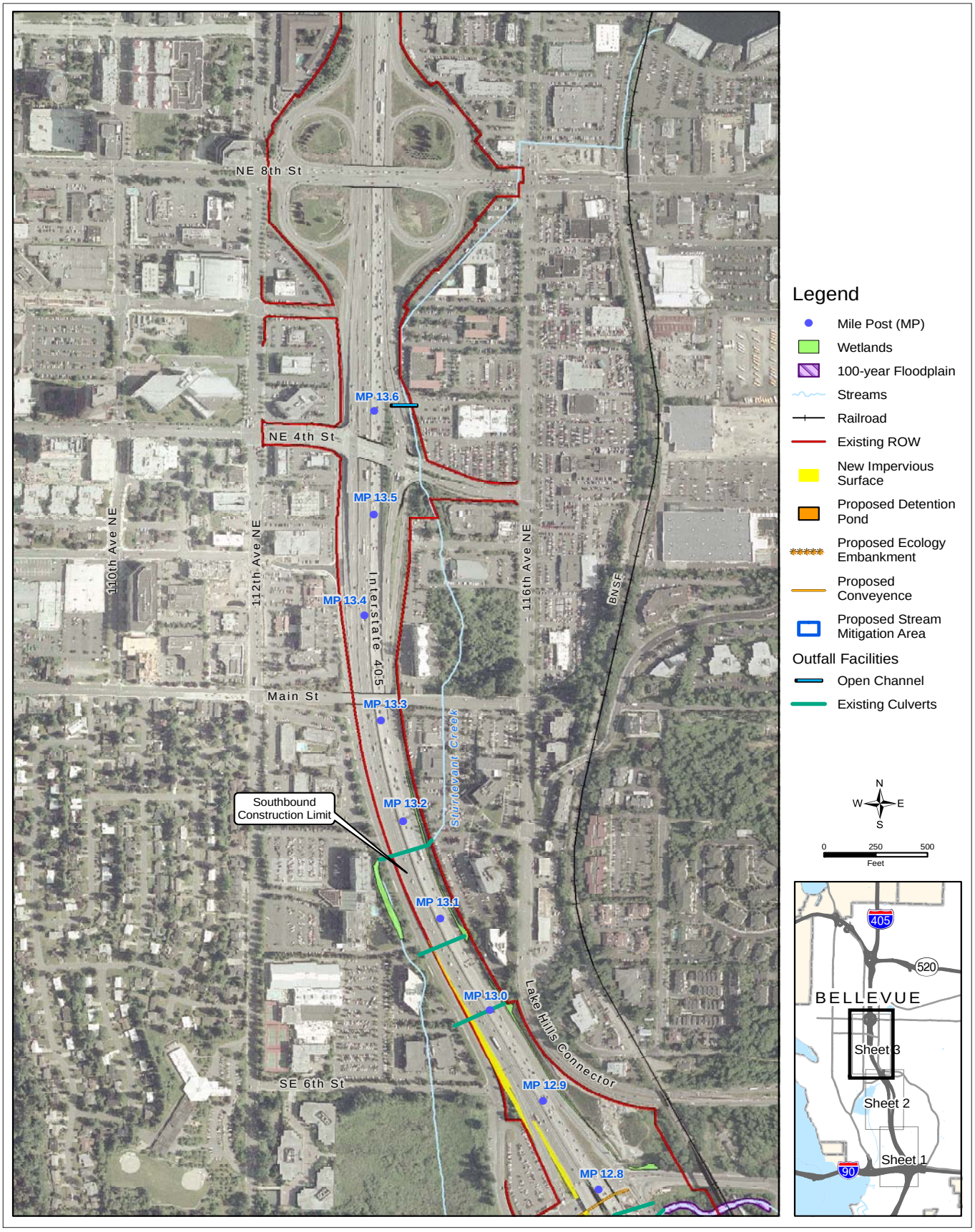

Source: WSDOT; 2004, King County; 2004 | \\SEAW405405gis\project\bellevue\map_docs\discipline_reports\project_description\Bellevue_Study_Area.mxd | Last Updated : 01-16-06 | Sheet 1 of 3

# Exhibit 5.4-1. Surface Water and Floodplains, MP 11.8 to 13.0 (Sheet 2 of 3)




Source: WSDOT; 2004, King County; 2004 | \\SEAW405\405gis\project\bellevue\map_docs\discipline_reports\project_description\Bellevue_Study_Area.mxd | Last Updated : 01-16-06 | Sheet 2 of 3

# Exhibit 5.4-1. Surface Water and Floodplains, MP 12.8 to 13.6 (Sheet 3 of 3)




Source: WSDOT; 2004, King County; 2004 | \\SEAW405\405gis\project\bellevue\map_docs\discipline_reports\project_description\Bellevue_Study_Area.mxd | Last Updated: 01-16-06 | Sheet 3 of 3

## What flood hazard and floodplain areas occur in the project vicinity?

There are no known flood hazard areas located within the project area. The nearest flood hazard areas are the floodplains associated with Kelsey Creek upstream of the project area and Mercer Slough downstream of the project. The elevation of I-405 is well above the floodplain elevation of Kelsey Creek, and the floodplains associated with Mercer Slough are located downstream of the project. Other streams in the study area are too small and confined to have considerable floodplain areas.

## How will the project affect floodplains?

The Bellevue Nickel Improvement Project will not encroach into any floodplain areas associated with Kelsey Creek, Mercer Slough, or other stream channels. The project will increase surface areas within the project area that cannot be penetrated by water; however, we will install a series of stormwater detention and treatment ponds connected to the floodplain that will lessen flows. In addition, since the elevation of Lake Washington controls the base flood elevation at Mercer Slough, the increase in peak flow rates of the project will not affect downstream floodplain elevations or area.

## How will the project affect surface water and water quality?

### Surface Water

Highways can affect water quality in three ways:

- Vehicles can leave deposits such as dust particles, hydrocarbons, and metals that can wash from the road surface to surface water during rainstorms.
- Highway right of way maintenance practices can contribute contaminants such as herbicides used to control invasive vegetation along roadside areas.
- Auto or truck accidents can produce chemical or fuel spills.

Currently, rain that falls on I-405 within the study area flows to road drains that discharge to storm sewers. There is a stormwater pond in the southwest quadrant of the I-405/Southeast 8th Street interchange that treats 2 acres of impervious surface area from I-405 in the vicinity of Southeast 8th Street. Otherwise, storm sewers discharge

untreated runoff into streams, wetlands, and ditches west of the highway.

The project will directly affect only one stream in the study area, Median Stream. During construction, we will realign the southbound I-405 roadway to the east into the existing median to allow for the construction of a new 7-lane tunnel. As a result, we will permanently cover approximately 500 linear feet, and approximately 0.25 acre, of Median Stream.

We will direct the existing flow of Median Stream into a new culvert under the realigned southbound I-405 roadway where it will discharge on the west side of I-405.

In addition to the new culvert for Median Stream, we will replace three other existing culverts that cross I-405 within the study area. These culverts are located at MP 11.7 (unnamed creek), MP 11.8 (unnamed creek), and MP 12.03 (Trail Creek).

### Water Quality

The Bellevue Nickel Improvement Project will create approximately 10.3 acres of new roadway surface within the study area. This will result in a slight increase in pollutant loading to stormwater discharged from the highway. The increased pollutant load will amount to only a small fraction of the pollutant load for the entire Mercer Slough watershed. With the Bellevue Nickel Improvement Project, the Mercer Slough basin pollutant loads will increase by less than 1 percent.

## How would the No Build Alternative affect surface water, floodplains, and water quality in the study area?

Under the No Build Alternative, the volume of runoff and pollutant loading would be the same as under existing conditions and there would be no effect on floodplains. Because the No Build alternative would not increase impervious surface area, there would be no change in stormwater runoff volume generated in the study area, or in the way that we manage runoff. Runoff water quality would also be the same as under existing conditions since the pollutant-generating surface area would be unchanged.

## How will project construction affect surface water, water quality, and floodplains?

Using standard construction BMPs (see Appendix B), the project should not affect surface water, floodplains or water quality. The Bellevue Nickel Improvement Project will include replacement of three culverts and installation of a new culvert to carry Median Stream across the southbound lanes of I-405. We expect that the new culverts will maintain or improve channel conditions by maintaining or increasing the capacity of these crossings.

As with any in-stream construction, replacing and installing these culverts will cause a temporary localized increase in stream turbidity (cloudiness) either during construction or after we route flow to the new culvert immediately following construction. BMPs, including project timing (to coincide with low-flow conditions), stream diversion during construction, and isolation of the work area during construction, will minimize the extent, duration, and intensity of these effects. We discuss potential effects to fish in Section 5.3, "Fisheries and Aquatic Resources."

The Bellevue Nickel Improvement Project will require disturbing soil and will have areas of exposed bare soil during construction. As with any construction that disturbs soil, there is a risk of surface erosion. This risk will be greatest in areas with steep slopes and erodible soils. The City of Bellevue has mapped the area of the project from approximately MP 11.2 to 12.6 as a soil erosion hazard area due to the combination of slope and erodible soil.

Without erosion-control BMPs, ground clearing, excavation, grading, and soil stockpiling could potentially stimulate soil erosion that could result in increased turbidity downstream. However, the project will be constructed using WSDOT standard erosion control BMPs that will reduce this risk. In addition, stormwater management facilities constructed for this project will be among the first elements completed so that they will be treating stormwater during construction as well as after the project is completed.

Since the Bellevue Nickel Improvement Project will not require any construction, staging, or other activity in floodplain areas, project construction will not affect floodplains.

## How will we minimize construction effects?

We will develop and implement the following:

- Temporary Erosion and Sediment Control Plan (TESC). The TESC will include BMPs to address the issues of source control, flow control, and treatment. BMPs will be site-specific and will include the following:
  - Installing check dams in drainage ditches to reduce water speed and allow fine sediment to settle.
  - Installing inlet protection filters to keep sediment from entering storm drains.
  - Installing bypass drains for steep slopes.
  - Timing culvert replacements to coincide with seasonal low-flow periods.
  - Diverting streams temporarily and isolating culvert replacements from stream flow to minimize discharge of sediment associated with culvert replacement.
- Spill Prevention Control and Countermeasures (SPCC) Plan will include the following required elements:
  - Identify general site information useful in construction planning, recognizing potential sources of spills, and identifying personnel responsible for managing and implementing the plan.
  - Identify staging, storage, maintenance, and refueling areas and their relationship to drainage pathways, waterways, and other sensitive areas. Specifically address the equipment maintenance, refueling, and cleaning activities and on-site storage areas for hazardous materials.
  - Identify spill prevention and containment methods to be used at each of the locations identified above.
  - Outline spill response procedures including assessment of the hazard, securing spill response and personal protective equipment, containing and eliminating the spill source, and mitigation, removal and disposal of the material.

## How will we mitigate for unavoidable adverse effects?

We will mitigate for unavoidable effects to Median Stream in coordination with federal and state resource agencies. We have developed a preliminary stream mitigation plan that includes on-site habitat restoration and creation.

The conceptual stream mitigation plan includes the following specific elements shown in Exhibit 5.4-2.

- Approximately 500 linear feet of new stream channel between southbound I-405 and 118th Avenue Southeast.
- Approximately 1.2 acres of new streamside vegetation along the newly created stream channel.
- Approximately 0.9 acre of enhanced stream buffer created by removing non-native plant species and replacing with native streamside vegetation.

These measures will produce a long-term improvement in functions and values of the water flow throughout this area, including wetlands, and will improve their ability to support any species that depend on this type of habitat.

Exhibit 5.4-2. Conceptual Stream Mitigation Plan